Mass Media as an HIV-Prevention Strategy: Using Culturally Sensitive Messages to Reduce HIV-Associated Sexual Behavior of At-Risk African American Youth

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The evidence base and theoretical frameworks for mass media HIV-prevention campaigns in the United States are not well-developed. We describe an intervention approach using culturally sensitive mass media messages to enhance protective beliefs and behavior of African American adolescents at risk for HIV. This approach exploits the potential that mass media messages have, not only to reach a large segment of the adolescent population and thereby support normative change, but also to engage the most vulnerable segments of this audience to reduce HIV-associated risk behaviors. The results from an ongoing HIV-prevention trial implemented in 2 medium-sized cities in the United States illustrate the effectiveness of this intervention approach. (*Am J Public Health.* 2009;99:2150–2159. doi:10.2105/AJPH.2008.155036)

The incidence rate of HIV in the United States is 7 times higher among African Americans than among Whites,[1] with disproportionate transmission through heterosexual contact.[2] Although adolescents with HIV/AIDS represent a minority of US cases (approximately 5%), they constitute one of the fastest growing groups of newly infected persons in the country, and African American adolescents are disproportionately affected. Of the estimated 18 849 persons under the age of 25 years who were diagnosed with HIV/AIDS during 2001 through 2004, 61% were Black.[3] Given these data, it is imperative that interventions focus on African American adolescents and specifically address the concerns that are unique to this population. In addition, it is especially desirable for HIV-prevention interventions to reach as large an audience as possible.

Mass media campaigns are well-suited to meet these goals because media have wide reach.[4,5] Adolescents in general, and African American adolescents in particular, are heavy users of media; and media messages can be culturally targeted to this audience. Furthermore, experience from commercial marketing suggests that African Americans respond favorably to mass media messages designed to address their specific interests.[6,7]

Unfortunately, the evidence for the effectiveness of general HIV mass media prevention campaigns in the United States is weak,[8] and this is particularly true for campaigns targeting African American adolescents. This is partly because researchers face problems in isolating media effects in multicomponent interventions.[4,9] In addition, most HIV prevention in the United States has been conducted on an individual level with small group counseling or school-based programs.[10] This practice has been justified through the belief that face-to-face interventions have greater power than mass media to alter HIV-associated risk behaviors,[4] in part because these interventions permit greater opportunities for active participation (e.g., skills training, modeling, and rehearsal) relative to viewing a media message.[11]

Here we describe a culturally sensitive approach to using mass media to promote greater acceptance of safer sexual behavior in the wider African American youth audience and, more importantly, to encourage behavior change (condom use) in the youth most at risk for sexually transmitted infections (STIs), including HIV. Interventions can be sensitive to the "surface structure" or "deep structure" of an audience's culture.[12] Surface structure refers to the use of change agents whose background and use of language is similar to that of the audience and the use of channels of communication that can best reach the audience. Sensitivity to deep structure reflects an understanding of how members of the audience conceptualize the health risk in their lives and the barriers they encounter in reducing or managing the risk. We designed an intervention to be sensitive to both types of structures, and we argue that culturally sensitive messages can be designed to actively engage youth, especially those who are most at risk for HIV infection. First, we review what is known about the use of media to influence the adoption of HIV preventive behaviors. We then illustrate the approach with preliminary data from a randomized controlled trial that was designed to rigorously test the effectiveness of such an intervention.

MASS MEDIA AND HIV PREVENTION

Considerable experience with mass media HIV-prevention campaigns has been gained from the developing world. These interventions suggest that safer sexual behavior can be encouraged by media messages that promote favorable norms and behavior in entire communities. Furthermore, successful interventions have employed sufficiently intense schedules of television or radio to reach the youth audience. In South Africa, for instance, the LoveLife program found that mass media in combination with a face-to-face intervention was associated with decreased risk of HIV infection, decreased number of partners, and increased use of condoms.[5] Furthermore, a radio and television HIV prevention campaign in Ghana directed at those aged 15 to 30 years was successful in decreasing sexual initiation among the youngest cohort. More generally, the media campaign increased awareness of AIDS and condom use among the sexually active.[13]

Another study in Ghana examining the effect of a mass media campaign, directed at those aged 15 to 24 years, found that the campaign increased personal risk perceptions and self-efficacy for condom use and lowered the perceived difficulties of obtaining a condom.[14] More recently, a mass media campaign in Kenya was successful in increasing the utilization of HIV testing among those aged 15 to 39 years.[15]

Experience with media campaigns toward adolescents in the United States and Europe suggests that similar effects can be achieved in developed countries. Media interventions were conducted in the 1980s and 1990s for adolescents and young adults in Switzerland and The Netherlands. In both countries, multimedia campaigns were associated with increased rates of consistent condom use, particularly among persons without steady sexual partners.[16–18]

Although media interventions designed to influence adolescent sexual behavior have been attempted in the United States, evaluations have only recently been able to isolate the effects of the media from other intervention components. A multimedia campaign directed to youth aged 14–18 years in Sacramento, California, was associated with a 4.3% population-based increase in condom use with steady partners.[19] An intensive television campaign directed to youth aged 14–18 years in Portland, Oregon,[20] was associated with a 10% increase in condom use for new partners. This finding was consistent with the emphasis in the campaign messages on new partners. Finally, in Lexington, Kentucky, a television campaign aimed at young adults who were above average in the sensation-seeking trait resulted in greater condom use and condom use self-efficacy and intentions.[21]

In several of these interventions, the mass media exerted greater influence on young people who were at higher risk for STIs, that is, sensation seekers[21] and people with new partners.[16,20] Despite these favorable findings, no evidence exists on the effects of media campaigns targeted to African American adolescents, especially to segments of the target audience that are particularly at risk. Here we outline an approach to developing a culturally sensitive mass media program that was expected to produce a continuum of effects ranging from behavior change in the most at-risk segments to changes in beliefs and attitudes that support normative changes in the wider—and less at-risk—community.

FRAMEWORK FOR CULTURALLY SENSITIVE HEALTH COMMUNICATION

Our approach to designing an effective culturally sensitive public health media program involved 2 major components. First, it required an understanding of the deep structure[12] of African American adolescents' culture. Indeed, culture, broadly defined as values, beliefs, norms, and behaviors shared by a group,[22,23] is important because these exert a powerful influence on sexual health behaviors. However, although African American youth may experience unique barriers to reducing unsafe behavior, we did not assume that their adolescent culture has a uniform influence on individuals. Indeed, we assumed that the culture represents a dynamic range of beliefs.[24,25] To gain greater understanding of these beliefs, we conducted in-depth interviews with a diverse group of youth exhibiting the continuum from little to considerable sexual risk behavior. These interviews enabled us to learn how youth conceptualize barriers to safer sexual behavior, as well as strategies for resisting pressures to engage in unsafe practices. Through this process, we identified "counter-narratives" that could inform the development of messages enabling youth to reject dominant arguments that support risk-taking behavior.[26] These counter-narratives could provide all adolescents, and particularly those most at risk, with strategies to resolve conflicts surrounding their own attempts to engage in safer behavior.

A second component of our approach was that to illustrate the use of effective counter-narratives, it was critical to employ dramatic depictions of youth modeling the use of these strategies. Mass media that simply lecture the audience about the benefits of safer behavior are less effective than dramatic formats.[27,28] Dramas provide the opportunity to embed arguments and counterarguments within a narrative that has personal relevance to the audience, especially those who are facing similar conflicts in their own lives.[29–31] Messages delivered as dramatic episodes use "learned self-relevance," a process that promotes identification and vicarious participation in the narrative.[27] Messages concerning high-risk behaviors should therefore have greater impact on youth at higher risk of infection with sexually transmitted diseases and HIV.

Our culturally sensitive approach is akin to the use of entertainment education, an approach that uses longer programming formats (e.g., telenovellas) to educate audiences about health-related topics.[13–15] This approach is designed to prompt a vicarious form of engagement (known as parasocial interaction) with media characters who elicit identification in audience members, in our case, those most at risk for STI or HIV infection. Although our use of television and radio spots afforded less opportunity to develop elaborate story lines, our shorter vignettes were nevertheless designed to speak directly to the segment of the audience most likely to adopt the recommended behavior.

The use of drama is also consistent with Bandura's social cognitive theory of mass communication,[32] which emphasizes the importance of media for modeling desirable behavior. Furthermore, Bandura's social cognitive theory,[32] which emphasizes the importance of beliefs about the consequences of adopting recommended behavior (outcome expectancies) and beliefs about personal ability to withstand opposition to the recommended behavior (self-efficacy) are critical mediators of change. Effective messages using drama should influence these beliefs as well as provide compelling models of safer behavior. Although the theory provides these conceptual guidelines, it was still critical to determine their content in designing a successful media intervention.

MEDIA MESSAGE DEVELOPMENT

To achieve the aims of an effective culturally sensitive communication program, semistructured interviews were conducted with 124 low-income African American adolescents in the cities where the media intervention was to be aired.[33] In addition, adult community advisory boards representing the cities made suggestions to the creative and research teams regarding media content.[34] Media messages were also pretested and modified after feedback from African American adolescents regarding the effectiveness and appropriateness of the messages.

Formative research was particularly important for understanding adolescents' beliefs

regarding barriers to engaging in protective behavior.[35] For example, it became evident that beliefs that condoms hinder sexual pleasure was common in the target audience.[33] One adolescent girl aged 17 years said, "It takes the feeling away. So that's why they, they don't none of them use them." To produce media messages relevant to negative condom use outcome expectations, we sought counter-arguments to the notion that condoms reduced sensation by analyzing what adolescents said was good about condoms. A few informants mentioned that condoms reduced stress, such as 1 adolescent boy aged 18 years who said, "They just safe to me . . . I feel like I can't catch nothing." Based on the adolescents' feedback, media messages were designed to debunk myths that condoms are uncomfortable by emphasizing the ability of condoms to enhance pleasure by reducing stress and worry regarding pregnancy and HIV or STIs (theme 1). We expected this message to change beliefs surrounding condom use in the entire youth audience.

Our formative research also indicated that it was important to counteract the belief that sex is necessary to maintain a relationship.[33] Only 9 of the 59 adolescent boys interviewed (15%) had not experienced vaginal intercourse. Those who had deliberately postponed engaging in sexual intercourse described being teased by peers for being unmanly. Girls who had postponed intercourse also perceived pressure indirectly, in their friends' explicit or implicit critiques of the masculinity of their partners. One adolescent girl aged 16 years said, "They were like: Why won't I have sex with my first boyfriend? What's wrong with him? And they pushed me more than he did."

Given the centrality of masculinity in the adolescents' discussions of pressures to pursue sexual experiences, we sought counterarguments engaging alternate positive views of masculinity. We found that arguments in favor of postponing sex hinged on notions of sexual etiquette and a view of masculinity based on mutual respect. One adolescent boy aged 18 years said, "She was just like, no, we shouldn't do it yet. And I'm like, alright, I respect that." Based on this feedback, we designed messages to promote the norm that "waiting to initiate sex" shows respect for one's partner as well as reflecting maturity and concern for one's partner (theme 2). We expected this message to be particularly influential for those who were sexually active.

Third, our research indicated that it was important to counteract the belief that a steady partner is a "safe" partner by emphasizing that one cannot always know with whom a partner is having or has had sexual contact in the past. These messages emphasized that condoms should be used even with steady partners[33] (theme 3). For instance, 1 radio ad depicts the 2 themes regarding "condom use with safe partners" and "waiting to initiate sex" through a conversation between 2 young men. The first explains that his girlfriend is not ready to have sex, but that his friends are pressuring him: "The guys are like 'Yo . . . you ain't hit that yet?'" His friend responds, "Hey, forget those fellas. Consider yourself a lucky man . . . I actually prefer a girl who respects herself and waits until she's ready," then emphasizes that using condoms represents self-respect. The tagline is delivered by an announcer at the conclusion of the vignette: "when you have sex with someone, you have sex with everyone they've ever slept with," which is followed by a reminder to use condoms correctly every time. We expected this message to be particularly effective for those who were at the highest risk of STI. Furthermore, we expected behavior change, as indicated by reports of unprotected sexual contacts, to be greatest among adolescents at highest risk of infection (i.e., STI-positive adolescents).

As part of the message strategy of the media production team, all of the radio and television spots featured hip–hop music and African American adolescent actors, all stressed the importance of using condoms, and all featured the tag, "Life is what you make it. Be safe. If you are sexually active, there's only one way to protect yourself for sure . . . use a condom correctly every time."

METHODS

The data analyzed in this study are part of project iMPPACS (an acronym developed for "in Macon, Providence, Philadelphia, Atlanta, Columbia, and Syracuse"), a multisite project involving researchers and practitioners with a wide range of expertise in adolescent health promotion. An important part of the team was the media production company Motivational, Educational Entertainment that has expertise in the development and production of media materials for African American youth.[36] We conducted the study in 2 matched northeast US cities (Providence, Rhode Island, and Syracuse, New York) and 2 matched southeast US cities (Columbia, South Carolina, and Macon, Georgia). All cities have sizable African American communities with above-average levels of poverty and high prevalence rates of STIs and HIV. The cities were selected for this study because they did not have a history of recent HIV/AIDS media interventions or extensive school-based efforts to reduce risky sexual behavior. Syracuse and Macon were randomly assigned to receive the media campaign in the northeast and southeast, respectively, with Columbia and Providence serving as controls.

The project recruited 1657 respondents (aged 14–17 years) between August 2006 and January 2008 through a variety of channels anchored in our collaboration with community-based organizations, such as Boys and Girls Clubs and community centers that provide recreational, social, and educational services for young people. We recruited 21% of our cohorts directly in those centers and 29% from participant referral. However, we also recruited youth using street outreach (9%), respondent-driven sampling (15%), and referral from adults in the community (14%). Only 25 (1.5%) of the eligible adolescents refused or were unable to participate in the study. An attempt was made to oversample adolescent girls who were expected to have higher rates of STIs.[37] The recruitment procedures in the 4 participating cities produced relatively equivalent samples in terms of sexual risk behavior, gender, and age (supplemental Table 1, available as a supplement to the online version of this article at http://www.ajph.org). Nevertheless, as described below, we also controlled for sample heterogeneity by using a propensity weighting procedure in all tests of intervention effects.

The media campaign ran continuously during the 15-month recruitment period in each media city using three 30-second television ads and eight 60-second radio ads. The ads were placed on channels and during programming hours that were popular among African American adolescents. On the basis of estimates provided by the media channels, the average adolescent in the media markets was

exposed to 3 television and 3 radio ads per month during the study period.

After assent by each youth and informed consent by his or her parents or guardians, the participants completed an assessment through an audio computer-assisted self-interview. A test-retest study of the audio computer-assisted self-interview was undertaken with a sample of African American adolescents before the trial and outcome measures were observed to have moderate to high levels of reliability.[38] In addition to the media intervention, project iMPPACS also included a small-group intervention component to which the participants were randomly assigned after completing the assessment. Upon completion of the project, the participants will have completed follow-up assessments at 3, 6, 12, and 18 months after the small-group intervention. Because the initial surveys were done during the 15-month recruitment period while the campaign was running, we use the results of these interviews in the present article to examine differences in core outcomes as a function of residence in either a media or nonmedia city. The result of the small-group intervention in combination with the media using follow-up data will be examined in future studies.

Participants provided urine specimens to assess the presence of 3 prevalent STIs among adolescents: gonorrhea, chlamydia, and trichomoniasis. Chlamydia and gonorrhea were tested by using Strand Displacement Amplification,[39] whereas trichomoniasis was tested by using a real-time polymerase chain reaction assay.[40] Urine collection occurred in a private room. Specimens were stored in refrigerators until packed in approved biospecimen boxes and shipped by overnight courier to the Emory University Microbiology Laboratory for assay. Youth who tested positive for any STI were treated and counseled by a medical care provider. However, the results of the testing were not known until about 2 weeks after the baseline audio computer-assisted self-interview had been completed. Youth received $30 for completing the assessments.

Data Analysis

We conducted a series of contingency table analyses to identify significant differences between intervention groups in sociodemographic variables and measures of sexual risk. For the multivariate analysis, we used negative binomial regression for count data, linear regression for normally distributed variables, and logistic regression for dichotomous variables. The multivariate analyses were conducted sequentially, starting with all simple effects (i.e., gender, age, media, time, risk groups) and the interaction of time and media in the model. We also included higher-order interactions (2- and 3-way interactions) that were kept in the final models if they reached significance and were taken out of the models if they did not. All analyses were conducted using Stata version 10.[41]

Although the 2 pairs of participating cities were carefully matched and the media intervention was randomly assigned to 1 city in each pair, the small number of cities makes it possible that observed media campaign effects are biased by preexisting differences in the cities. To reduce this possible bias, we adjusted uncontrolled background factors by using a propensity-score approach to construct weights for individual observations.[42,43] We obtained the weights by taking the inverse of the estimated probability that an individual was in a media city. This probability was calculated with a logistic regression predicting media city by using 130 background factors that might differ between media and nonmedia cities but that could not be influenced by the media intervention, such as gender, age, native born status, number of siblings, and grades in school. The "pweight" Stata command was then used to enhance equivalence between media and nonmedia cities for all multivariate analyses. This weight option uses a robust variance estimation technique to correct variance, standard errors, and confidence intervals.

Predictors

Demographics and media exposure. Respondents were coded for presence in a media city (1=yes; 0=no). Because the media campaign could have a cumulative impact over time, we also entered the simple effect of time elapsed since the start of the media campaign (in 3-month intervals) and the interaction between this variable and media city. The respondent's age and gender were included in all models and their interactions with intervention variables were tested and kept when significant. The survey assessed exposure to the media campaign by asking the respondents whether they had seen a television ad or heard a radio ad in the last month that talked about the risks of STIs or HIV (0=had never seen [television] or heard [radio] ads; 1=had heard or seen ads; 2=had heard and seen ads). Although a more sensitive measure would have been to assess awareness of actual segments of the media messages, such questioning was avoided at baseline because it might have introduced media influence in the nonmedia cities, confounding the interventions in the overall trial. However, these data were available at the 6-month follow-up assessment, and we also report these results (0=had not seen any ads; 1=had seen one or more ads).

Risk groups. Three levels of risk were examined to test the hypothesis that the media campaign would have particularly strong effects among those to whom the messages were most relevant. The risk groups were defined a priori based on their increasing risk of acquiring an STI: (1) not sexually active (no anal, oral, or vaginal sex in the past 3 months) and STI negative, (2) sexually active and STI negative, and (3) STI positive. We examined differences in media effects across these 3 groups and by gender within each group. The STI-positive group (category 3) included both recently sexually active (n=91) and nonsexually active adolescents (n=15). Logistic regression analysis confirmed that STI-positive adolescents constituted a particularly risky group among the sexually active adolescents in that they were more likely to have had a previous STI test, they had lower condom use intentions, and they had had more sexual partners than the sexually active adolescents who tested negative for an STI. However, there were no differences in these risk factors across media and nonmedia cities, indicating that STI-positive youth in the media cities were relatively comparable to those in the nonmedia cities.

Dependent Variables

The effects of the 3 media themes were examined separately in 5 models. Two outcome variables measured the effect of the first media theme that attempted to counteract the belief that condoms hinder sexual pleasure. First, 1 item from the Condom Attitude Scale[44] asked respondents whether they agreed that "condoms create a sense of safety." Respondents were categorized into 2 groups: 0=those who

strongly agreed versus 1=those who agreed less strongly or disagreed. Second, expectancies that condoms hinder pleasure were measured by summing agreement responses for the following items from the Condom Attitude Scale[44,45]: (1) Condoms take away the pleasure a guy has during sex, (2) condoms are messy, (3) condoms make sex hurt for girls, (4) condoms take away the pleasure of sex, and (5) using condoms takes "the wonder" out of sex. For all, 1=strongly disagree to 6=strongly agree. Cronbach α for the scale was 0.78.

The second media theme, "waiting to initiate sex shows respect for one's partner," was assessed through 2 separate outcome variables. First, 2 items from the Outcome Expectancy and Perceived Vulnerability Scale were used.[46] Respondents were asked how likely it would be that (1) the quality of and (2) the love in a relationship would increase if they had vaginal sex in the next 3 months (1=very unlikely to 6=very likely). The sum of these variables was used to measure perceptions that sex improves a relationship. Cronbach α for the scale was 0.69. The second media theme was also assessed through the degree to which respondents considered themselves able to say no to having sex, a variable that took the sum of the following items from the Sex Refusal Self-Efficacy Scale[47]: How sure are you that you would be able to say no to having vaginal sex (1) if you have known the person for a few days or less, (2) if you want to date him or her again, (3) if you want the person to fall in love with you, and (4) if the person is pressuring you to have sex. For each item, 1=I definitely could say no to 4=I definitely could not say no (scale range=4–16; α=0.84).

The third media theme, which counteracted the belief that a steady partner is a "safe" partner, was assessed by using 3 items from the Condom Attitude Scale[44] that examine the perception that condoms are not needed with certain types of partners. This measure was based on the sum of the following items: condoms are not needed (1) if you are sure the other person does not have a sexually transmitted disease, (2) if you know your partner, and (3) if you and your partner agree not to have sex with anyone else. For each item, 1=strongly disagree to 6=strongly agree (α=0.85).

Unprotected sex contacts were measured by using the sum of 3 items that asked respondents how many times in the past 3 months they (or their sexual partner) had not used condoms when having vaginal, oral, and anal sex. Such counts of unprotected sexual contacts are regarded as the best way to evaluate the risk of STI and HIV contraction.[48] Unprotected vaginal contacts were correlated with anal (Spearman r=0.231; P<.001) and oral (Spearman r=0.282; P<.001) unprotected contacts. Because all 3 types of sexual behavior were correlated and they each pose a risk for acquiring an STI, we summed responses to the 3 types of exposures to create an overall score of unprotected sex (ranging from 0 to 72). Validity for this score was evident in a negative binomial regression predicting non–condom-use contacts from infection with a sexually transmitted disease, age, alcohol use, and cigarette use. To exclude potential media effects, we restricted the analysis to respondents from the nonmedia cities. Results showed that the unprotected sex score was significantly related to having tested positive for an STI (b=0.587; P=.034).

Number of sexual contacts was measured by using the sum of protected and unprotected vaginal and anal sexual contacts in the past 3 months. Responses ranged from 1 to 65.

To validate that differences between media and nonmedia cities were attributable to the media campaign and not to a spurious relation, we examined differences between cities in risk behaviors not mentioned in the media campaign. Outcome variables used were substance use attitudes: 1=smoking or drinking would be very bad for me to 4=smoking or drinking would be very good for me; perceived health risks of cigarette use: 1=smoking would be very risky for my health to 4=smoking would be not at all risky; and peer norms about how many friends smoke cigarettes: 1=none to 6=almost all. We also examined city differences in reported alcohol use (1=never drank to 7=drank on 100 or more days in lifetime) and cigarette and cannabis use (0=never used versus 1=used in lifetime).

Last, because our intervention efforts did not attempt to increase condom availability, we examined city differences on a composite score that assessed differences in the perceived difficulty of obtaining or carrying condoms (1=very hard to 6=very easy).

RESULTS

A fundamental premise behind the success of a media campaign is that the target audience is exposed to the campaign messages. A large proportion of the study participants watched television (69%) and listened to radio (47%) 2 or more hours on a typical weekday, which made it clear that the media messages had the potential to reach the target population. Furthermore, throughout the study period, the mean reported exposure rate to HIV prevention messages was higher in the media cities (1.51) than in the nonmedia cites (1.35; b=0.156; P<.001). Although these results indicate that campaign awareness was greater in the media than it was in the nonmedia cities, the results suggest that youth in the nonmedia cities also received HIV-prevention messages. At the 6-month follow-up, we probed for recognition of actual segments of the television and radio ads. We found that nearly all of the youth in the media cities (97%) had seen or heard a campaign ad, whereas only 36% of youth in the nonmedia cities falsely reported seeing or hearing a campaign ad. Thus, we have evidence that the campaign reached our intended target audience despite the presence of other messages that potentially originated from national sources such as MTV (there was no local media campaign directed to STI and HIV prevention in either nonmedia city).

A regression analysis based only on respondents in the media cities also showed that adolescent girls reported more media exposure than did adolescent boys (b=0.186; P<.001). However, media exposure did not differ by risk group (sexually active, STI-negative adolescents: b=0.040; P=.402; STI-positive adolescents: b=–0.006; P=.942).

Demography, Sexual Behavior, and Comparability of Conditions

The participants' ages ranged from 14 to 17 years (mean [SD]: 15 [1.05]) with 978 (60%) adolescent girls. Six adolescent boys reported anal sex with men, 2 of whom also reported anal sex with women. Because of the small number, no separate analyses were conducted with this subsample. Furthermore, 16 adolescents tested positive for at least 1 STI but reported no prior sexual contact. Because these cases may have been false positives and were

not asked about the number of previous sexual contacts, they were excluded from further analysis. A total of 625 (38%) respondents were sexually active and STI-negative, and 106 respondents were STI-positive (6.5%). In addition to the relatively high STI prevalence, 29% of sexually active adolescents reported a history of HIV testing.[49] Of those adolescents tested, 6 reported being positive for HIV (2.1%), and 39 did not know their results (14%). There were no significant differences between adolescents in the media cities and the nonmedia cities in terms of gender and sexual experience (supplemental Table 1, available as a supplement to the online article at http://www.ajph.org). Proportionally more adolescents in 1 media city did, however, test positive for an STI, and participants in 2 cities were slightly younger than in the other 2.

Relations Between Outcome Variables

To assess the relations between the outcome variables, rank-order correlations were computed (see supplemental Table 2, available as a supplement to the online article at http://www.ajph.org). Our message strategy to increase the acceptance of condoms appears to be justified, because this outcome was significantly related to each of the other outcomes. That is, youth who thought that condoms hinder sexual pleasure were more likely to believe that condoms do not provide a feeling of safety, that they are not needed with safe partners, that having sex improves the quality of a relationship, and that they lacked sex refusal self-efficacy. Most importantly, they also tended to engage in more unprotected sex. Other outcomes that were also directly related to unprotected sex were the belief that condoms are not needed with a safe partner and that sex refusal self-efficacy was lacking.

Media Effects

With 1 exception, the effects of the media intervention were more evident for youth who were sexually active (see supplemental Table 3, available as a supplement to the online article at http://www.ajph.org). The results showed that the media message that was intended to increase acceptance of condoms (by reducing beliefs that condoms hinder sexual pleasure; theme 1) was successful among all 3 risk groups (model 1; Figure 1a). The first theme was also assessed through respondents' expectancies that condoms give a feeling of safety. For this outcome, media messages resonated particularly well among the sexually active adolescents who did not have an STI (model 2; Figure 1b), although change among STI-positive youth may have been limited by a floor effect.

The second theme, which promoted the norm that waiting to initiate sex shows respect for one's partner, had positive effects among the sexually active and the STI-positive adolescents. Specifically, in the media cities, these adolescents were more likely to report greater sex refusal self-efficacy (model 3). However, as Figure 1c shows, STI-positive adolescents scored low on this outcome even in the nonmedia cities. In regard to expectancies that sex is not needed to improve a relationship (model 4), the results also showed that the theme resonated particularly well among the STI-positive adolescents (Figure 1d).

The third campaign theme, which attempted to counteract the belief that a steady partner is a safe partner with whom condoms are not necessary, was also particularly effective among the highest risk group (Figure 1e). Model 5 showed that the media campaign successfully decreased the belief that condoms are unnecessary with safe partners. Yet, an interaction term with time suggested that the media effect leveled off over time ($b=1.203$; $P=.007$).

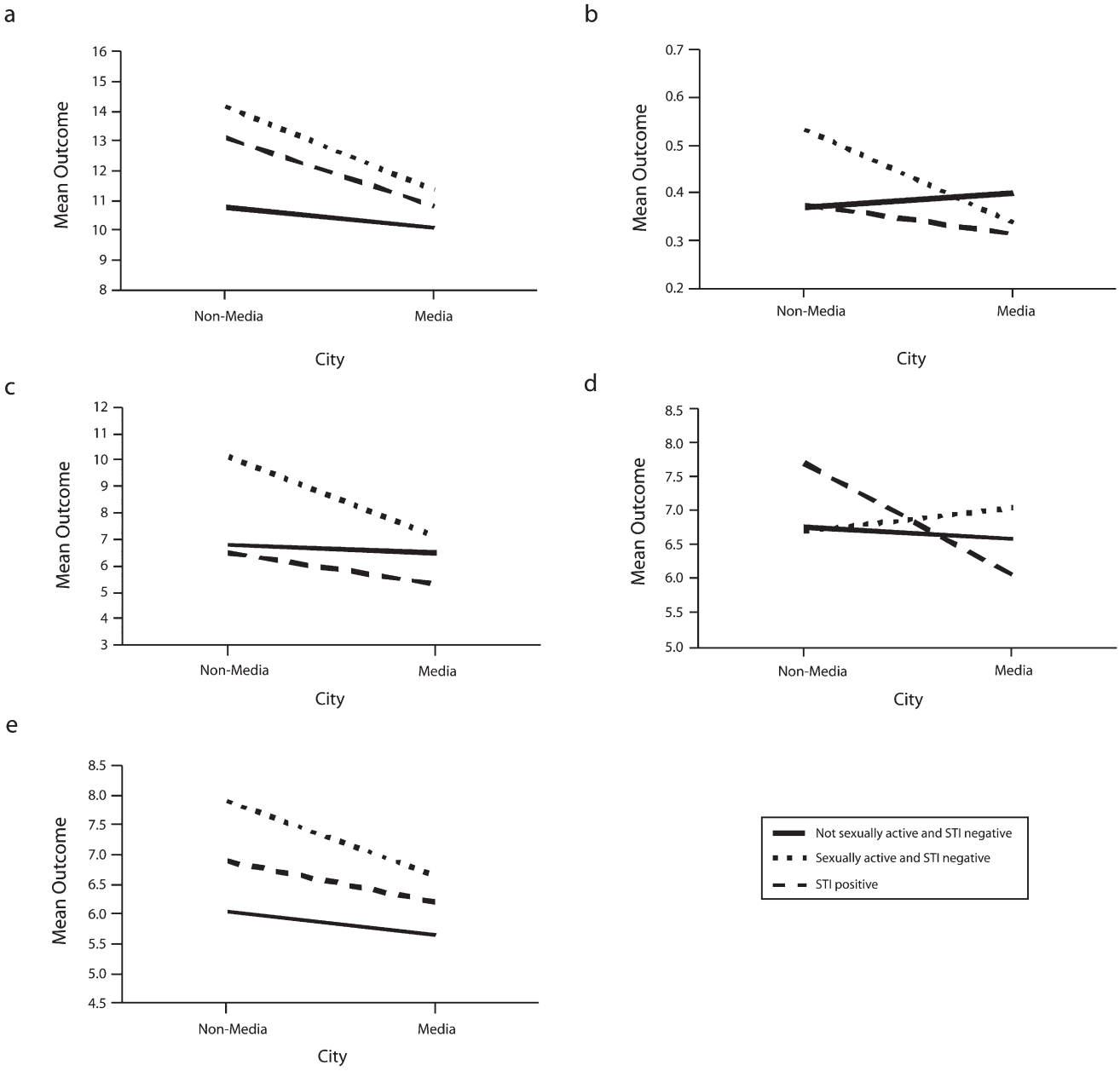
The results for unprotected sexual occasions are shown in Table 1. This analysis was based on sexually active adolescents only because details about protected sex were asked only of these adolescents. The results showed that STI-positive adolescent girls in the media cities reported fewer non–condom-use occasions than did their counterparts in the nonmedia cities. Note that the estimates for adolescent boys were unreliable because there were only 21 STI-positive boys. The number of sex occasions did not differ between media and nonmedia cities or by gender and STI status (results not shown).

Although the use of geographically matched cities and propensity-score matching enhanced the equivalence of the test versus control sites, we could not rule out the possibility that the observed differences were attributable to trends that would have occurred in the absence of the media campaign (e.g., greater concern for risky behavior in the media cities). However, if this were the case, we would expect the media cities to have exhibited lower levels of other risk attitudes and behaviors as well. In turn, we examined city differences in terms of substance use outcome expectancy, risk belief, norms, and behavior. We did not find overall or subgroup differences in terms of any of these 18 outcomes ($P<.05$), except for 1 in which sexually active STI-negative adolescents in the media cities were less likely to smoke cigarettes. However, this 1 significant effect out of 18 tests could very well be expected due to chance.

We also examined 1 sex-related outcome that was not mentioned in the media messages. Indeed, if the results we obtained were in fact a result of the media campaign, we would expect there to be little or no effect on responses to outcomes that were not directly targeted in the campaign. We thus examined media effects on a composite score that assessed differences in the perceived difficulty of obtaining or carrying condoms. This outcome was not related to the media campaign overall or within any subgroup.

DISCUSSION

We have outlined an approach to developing culturally sensitive HIV-prevention media materials. With the intersecting STI and HIV epidemics growing disproportionately in low-income African American communities, there is a need to implement such interventions to enable adolescents at highest risk to avoid continued risk taking and to encourage the entire adolescent community to support safer sexual practices. Prevention practitioners and researchers agree that culturally sensitive health communications are more effective than culturally neutral information.[50,51] Indeed, cultural factors are important to HIV prevention because they can exert a powerful influence on sexual health behaviors. However, culture is dynamic and diverse, and dominant norms do not exert a uniform influence on individual behavior. As a result of careful formative research, it was possible to identify culturally sensitive messages that could support safer sexual behavior in this audience. These messages used dramatic formats to illustrate health-promoting behavior that would have high relevance to youth at greatest



Note. Participants rated their likelihood of taking certain actions or their agreement or disagreement with a series of attitude assessment statements. Higher mean scores indicated a greater likelihood or greater agreement for each outcome.

Figure 1—Weighted, unadjusted means of the following outcomes regarding media message themes by risk group and media versus non-media cities for (a) condoms hinder sexual pleasure, (b) condoms do not provide a feeling of safety, (c) lack of self-efficacy to refuse sex, (d) sex improves a relationship, and (e) condoms are not needed with safe partners: Project iMPACCS; 2 matched northeast and 2 matched southeast US cities, 2006–2008.

risk of infection (sexually active youth with pre-existing STI).

We anticipated and found that our media messages had a continuum of effects, ranging from improved outcome expectancies regarding condoms among all youth to reports of reduced unprotected sexual contacts among those who were already infected. Our stronger findings for STI-positive adolescent girls in regards to unprotected sexual contacts may reflect the fact that girls were disproportionately represented among this highest risk group (85 out of 106 STI-positive adolescents) and that we also oversampled adolescent girls because of their greater propensity to acquire STIs.[37] Other differential effects were likely to result from the differing levels of relevance of the messages to the audience.[29–31] For example,

TABLE 1—Final Model for Unprotected Sex Contacts: Project iMPACCS; 2 Matched Northeast and 2 Matched Southeast US Cities, 2006–2008

Determinants	Model 6,[a] b (95% CI)
Adolescent girl	0.381 (−0.219, 0.981)
Age at baseline (range, 14–18 y)	0.486** (0.351, 0.621)
Media city	0.890* (0.186, 1.593)
Time	0.127 (−0.053, 0.306)
Media city × time	−0.200 (−0.431, 0.032)
STI positive	−0.315 (−0.835, 0.206)
STI positive × media city	1.056 (−0.636, 2.749)
STI positive × girl	0.595 (−0.290, 1.480)
STI positive × girl × media city	−1.946* (−3.861, −0.031)
Adolescent girl × media	−0.460 (−1.311, 0.391)

Note. CI = confidence interval; STI = sexually transmitted infection. N = 706. The final model was a weighted regression analysis. The matched northeastern cities were Providence, Rhode Island, and Syracuse, New York; the matched southeastern cities were Columbia, South Carolina, and Macon, Georgia.
[a]Non-condom-use occasions (range = 0–72).
*$P < .05$; **$P < .001$.

acceptance of condom use should be relevant to all in the audience. However, messages designed to convince adolescents of the benefits of delaying sex in a relationship or of using a condom even with partners who might otherwise seem safe might not seem particularly relevant to nonsexually active adolescents who may not have a romantic partner. Sexually active adolescents, on the other hand, are more likely to relate to the conflicts that the characters depicted were experiencing, thereby creating an opportunity for applying the situations to their own experience.

A second element that may produce differential audience effects is the opportunity to change one's behavior. In a situation where the audience already agrees that condoms provide a feeling of safety, for instance, there is limited opportunity for the media campaign to achieve further change. Such a "floor effect" for STI-positive adolescents is suggested in Figures 1b and 1c, and the same effect for adolescents who were not sexually active and STI negative is particularly evident in Figure 1d–e. On the other hand, although media messages might have effects that are currently difficult to detect because of floor effects, they may become more evident as adolescents mature. Indeed, Bandura[32] theorizes that media messages can have a prompting function that makes previously learned behavior salient, especially when it is relevant to the audience. This mechanism functions primarily to reinforce existing skills and behaviors that might otherwise lose salience. From this perspective, it is possible that effects of continued media exposure will become evident at later follow-up assessment when safer behavior is more relevant to adolescents. Indeed, the adolescents in the media cities who were not sexually active during the recruitment phase may adopt safer sexual practices and attitudes once they initiate sex than would their counterparts in the nonmedia cities. This is a possibility that will be explored as the cohort ages.

Despite the differential effects of the media, we found that acceptance of condom use among all segments of the audience was strongly related to all other outcomes, particularly to reports of condom use among sexually active youth. It is noteworthy that this outcome appeared to have the widest response in our audience. Indeed, our intention was to produce widespread change in this belief so that support for use of condoms would be normative in the youth community.[52] Although this belief alone was not sufficient to change behavior among all sexually active youth, it may nevertheless have helped to support change among the most vulnerable to infection and laid the groundwork for future protective behavior among audience members who would otherwise become vulnerable.

Research on mass media effects has been criticized for not incorporating particularly rigorous designs,[8] and this might explain why several large community trials have identified only weak effects.[53] One strength of the current study is that it explored a continuum of media effects. Previous evaluations of mass media prevention campaigns have often failed to do so, which may have reduced the sensitivity of the studies because the entire audience was treated as equally susceptible to the intervention when in reality effects ranged over a continuum representing differential risk to the audience.[54]

Limitations

The present research design included control groups that should have held constant regional and national differences in adolescent sexual behavior. Nevertheless, the design was limited by the fact that we did not have assessments for a period before the media campaign. Furthermore, we included a limited number of cities in our study, which makes it difficult to control random effects. We partly compensated for these factors, however, through propensity score weighting and by examining risk behavior and expectancies not directly linked to the media campaign. Because we found no city differences in these variables, we can be more confident that the differences in sexual attitudes and condom use behavior we observed were attributed to the media campaign and not to trends that were occurring apart from the campaign. In addition, the cities were selected because they did not have local campaigns directed to sexual behavior before their selection, and pilot work indicated that youth were equally sexually active in the 4 cities, a finding that was also observed in this study. Thus, it seems unlikely that the differences we found were present before the media intervention.

Another limitation is that we relied on self-report, which can be influenced by memory or motivational biases; however, the use of audio computer-assisted self-interview should have reduced some of this bias. In addition, reports of unprotected sex were related to existing levels of STIs, suggesting that they do reflect valid variation in sexual risk behavior. Nevertheless, we are currently conducting follow-up surveys with the youth cohorts in the study with STI testing at 6, 12, and 18 months after

baseline. This will provide an opportunity to determine the effects of the campaign on a biological outcome as well as on self-reports of safer behavior.

Conclusions

In the fields of public health and health communication, scholars believe that although mass media afford the broadest reach, interpersonal communication is more efficacious.[7] This conclusion is based on the assumption that the use of mass media resembles a passive intervention, characterized by the presentation of material to an audience that has limited participation. Indeed, in a recent meta-analysis of HIV prevention interventions, Albarracín et al.[10] found that passive interventions are less effective than are active interventions that use exercises (e.g., role playing) to increase behavioral skills. Reardon and Rogers,[55] however, argued that the distinction between mass media and interpersonal communication may be a false dichotomy. Similarly, Horton and Wohl[56] originally described the relationship between media characters and audience as parasocial, in that the audience forms a relationship with a performer that is perceived as analogous to the interpersonal relationship of people in face-to-face interaction.

The present study proposes a similar characterization of mass media interventions. Although it is correct that the present media campaign does not actively engage the adolescents in role play, it uses dramatic depictions of conflicts surrounding adolescent sexual behavior that model individual decision-making processes and behavior in situations relevant to high-risk audience members. These were intended to engage the audience to adopt the role of the media characters and hence use the media messages as a template for their own decisions and behaviors. This is also akin to Bandura's theory of mass communication,[32] which emphasizes that demonstrations of appropriate behavior by culturally relevant actors can teach audience members new ways of thinking and acting.

A substantial reduction in HIV incidence will require wide-reaching dissemination of effective interventions. Because scarce resources for STI and HIV prevention strain communities, it is crucial that interventions achieve the largest possible impact among the largest possible segment of the target population and that they to do so in a financially sustainable manner.[57] It has previously been established that the use of mass media is a cost-effective HIV-prevention approach.[58] It is also likely that media effects will be enhanced by appropriate face-to-face interventions delivered in community settings. Nevertheless, this study provides further evidence that if a media campaign achieves high exposure and is developed on the basis of careful formative research, it can be an effective HIV-prevention tool for reaching high-risk youth within communities that need them the most. ■

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Contributors

D. Romer and S. Sznitman directed the analysis, interpreted the findings, and were the principle authors of the article. R. DiClemente, L.F. Salazar, P.A. Vanable, M.P. Carey, M. Hennessy, L.K. Brown, R.F. Valois, and B.F. Stanton designed the study and contributed to the interpretation of the findings and the writing of the article. T. Fortune and I. Juzang directed the production of the mass media campaign.

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